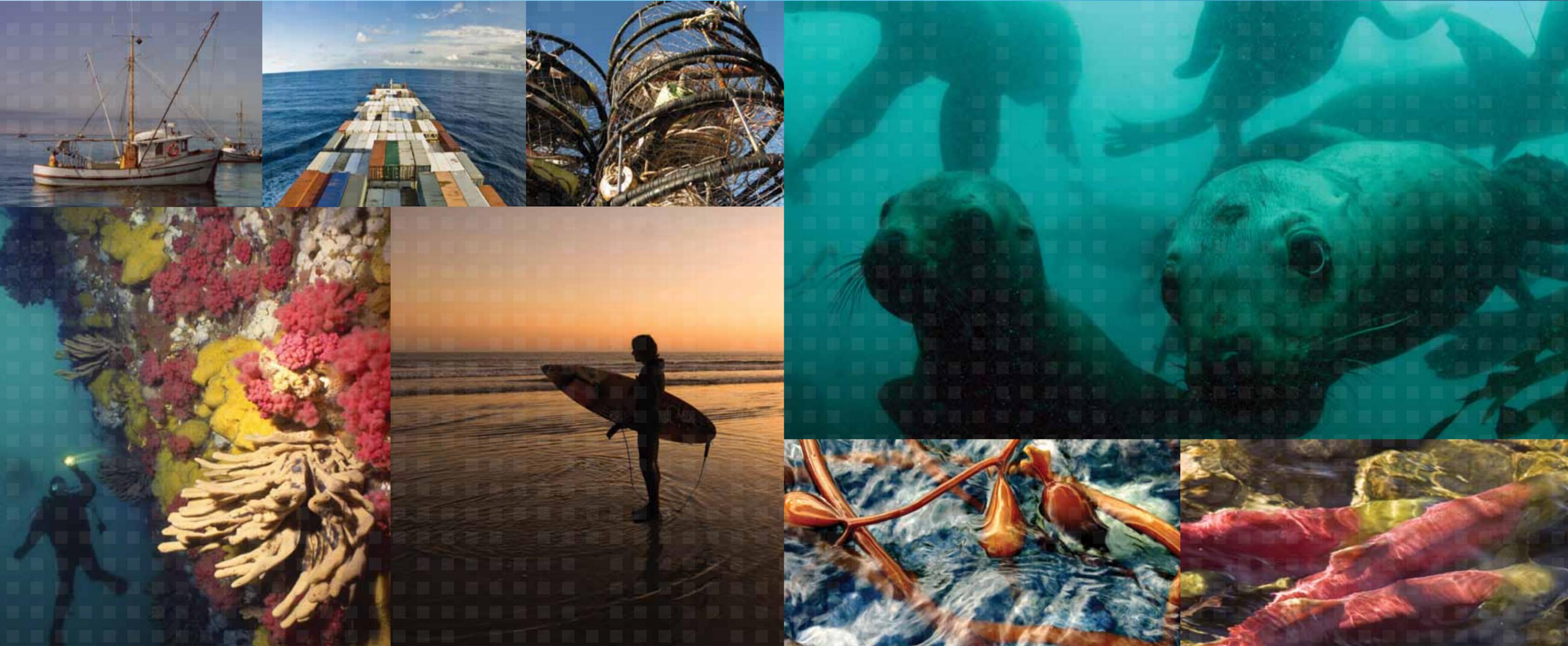




BRITISH COLUMBIA
MARINE CONSERVATION ANALYSIS

Marine Atlas of Pacific Canada

a product of the British Columbia Marine Conservation Analysis (BCMCA)



This atlas is dedicated to all the people who gather information about this coast and the people who create maps to share this information with the public. Without their tireless efforts, this project would not have been possible. The BCMCA Project Team would like to make a special recognition of Jacqueline Booth (August 13, 1954 - March 20, 2009). Jacky was a highly respected practitioner in the field of coastal and marine resources who bridged the interface between marine science and management particularly well and pioneered the application of GIS to this science. Through her consulting work in BC for federal, provincial, and local governments, First Nations, land trusts and not-for-profit organizations she influenced many of the datasets portrayed in this atlas. Jacky volunteered her time generously to the BCMCA and she is greatly missed by all her coastal colleagues. We are thankful that she inspired many people in this field.

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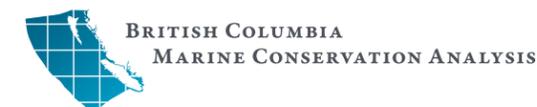
The maps printed in this atlas represent a selection of all the marine features mapped by the BCMCA. The full collection is available online at www.bcmca.ca/data

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Marine Atlas of Pacific Canada

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acknowledgements

acknowledgements

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We would like to acknowledge and thank all the organizations and agencies represented by the BCMCA Project Team and Human Use Data Working Group (H UWG) for their generous contributions of in-kind staff time and other resources. We recognize and thank all the BCMCA Project Team participants and representatives on the Human Use Data Working Group for their thoughtful collaboration in steering the project. Current and former members and observers of the BCMCA Project Team are Susan Anderson Behn from Island and Approach First Nations Fisheries, Cheri Ayers from Hul'qumi'num Treaty Group, Natalie Ban from University of British Columbia (2006-2008) and James Cook University (2008-2011), Julie Beaumont from Coastal First Nations, Karin Bodtker from Living Oceans Society*, Christopher Bos from Sport Fish Advisory Board, Tanya Bryan from Nature Conservancy of Canada*, Kevin Conley from Fisheries and Oceans Canada, Ken Cripps from Coastal First Nations, Sarah Davies from Fisheries and Oceans Canada, Andrew Day from West Coast Vancouver Island Aquatic Management Board, Steve Diggon from West Coast Vancouver Island Aquatic Management Board (2007), Dana Haggarty from Hul'qumi'num Treaty Group, Christa Hrabok from British Columbia Ministry of Environment, Hilary Ibey from Fisheries and Oceans Canada, Kate Ladell from Living Oceans Society (2007) and Fisheries and Oceans Canada (2010), Lynn Lee from Haida Oceans Technical Team, Sean MacConnachie from Fisheries and Oceans Canada, Greg MacMillan from Parks Canada, Murray Manson from Fisheries and Oceans Canada, Chris McDougall from Haida Oceans Technical Team, Dave Nicolson from Nature Conservancy of Canada (2006-2008)*, Miriam O from Fisheries and Oceans Canada, Manish Om Prakash from British Columbia Ministry of Environment, Craig Outhet from North Coast-Skeena First Nations Stewardship Society, Rob Paynter from British Columbia Integrated Land Management Bureau, Glen Rasmussen from Fisheries and Oceans Canada, Krista Royle from Living Oceans Society (2006) and Parks Canada (2007-2011), Wayne Saito from BC Ministry of Environment, Charlie Short from British Columbia Integrated Land Management Bureau (2006 – 2010) and Ministry of Forests, Lands and Natural Resource Operations (2011), Karen Topelko from British Columbia Ministry of Environment, Bruce Turriss from British Columbia Seafood Alliance, and Charlie Twaddle from British Columbia Ministry of Environment. Current and former members and alternates of the BCMCA Human Use Data Working Group are Kim Barbero from British Columbia Marine Trades Association, Christopher Bos from Sport Fishing Advisory Board, Doug Daugert from Sport Fishing Advisory Board, Paula Galloway from British Columbia Salmon Farmers Association, Michelle James from Underwater Harvesters Association, Kim Johnson from Shell Canada, Les Kiss from Coast Forest Products Association, Jessica McIlroy from Ocean Renewable Energy Group, Jane McIvor from British Columbia Marine Trades Association, David Minato from British Columbia Salmon Farmers Association, Phillip Nelson from Council of Marine Carriers, Norm Penton from British Columbia Salmon Farmers Association, and Bruce Turriss from British Columbia Seafood Alliance.

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Finally, we would like to acknowledge that the BCMCA was initiated in 2006 to address recommendations from a formal peer review of Living Oceans Society's Conservation Utility Analysis in 2005. We thank Living Oceans Society who, with the support of the Canadian Parks and Wilderness Society, David Suzuki Foundation, Nature Conservancy of Canada, Sierra Club BC, and World Wildlife Fund Canada, initiated the BCMCA and worked to assemble the initial Project Team.

“Thank you, all!”

introduction, guiding principles & identifying and collating data

introduction

The British Columbia Marine Conservation Analysis (BCMCA) is a collaborative project designed to provide resource managers, scientists, decision-makers, and those with a vested interest in the marine environment with products to help inform integrated marine planning and management initiatives. This atlas is one of those products. The BCMCA produced this Marine Atlas of Pacific Canada as a collection of peer-reviewed, expert-recommended, and best spatial data available to this project at scales relevant to coastwide marine planning and resource management.

The overall purpose of the BCMCA project is to collaboratively identify marine areas of high conservation value and areas important to human use in Canada's Pacific Ocean. The BCMCA used the data presented in this atlas in a series of analyses designed for that purpose. Please see www.bcmca.ca for results and reports on these analyses.

The BCMCA project is directed by a project team that coordinates, organizes, prioritizes, and reviews the work of the project. The project team is comprised of representatives from federal and provincial government agencies, academia, ENGOs, and marine user groups. Representatives of First Nations, as well as some other organizations, chose to sit on the project team as observers. Each team member serves as a liaison between the BCMCA project and the organization, agency or sector they represent. A Human Use Data Working Group (HUWG) provided guidance on human use data, atlas pages, and the use of human use data in analyses. The HUWG is made up of representatives from six marine use sectors: commercial fisheries, recreational fisheries, ocean energy, shipping and transportation, marine and foreshore tenures, and tourism and recreation.

guiding principles

Eight principles, drafted by the project team, guide work on the project:

- 1) use the best available information, including the latest in marine conservation planning theory;
- 2) assemble and use the best available biological, ecological, oceanographic, and socio-economic data;
- 3) faithfully and transparently reflect the accuracy, scale, and completeness of the data;
- 4) draw on the knowledge and expertise of governments (federal, provincial, and First Nations), other resource managers, user groups, the conservation community, academics, and other scientists to develop sound, scientifically defensible methods and products;
- 5) utilize methods which are transparent in their application;
- 6) incorporate ecological, social, and economic objectives in the analysis and balance these in a range of solutions;
- 7) work cooperatively to achieve project goals; and
- 8) create products which are widely supported by partner organizations.

identifying and collating data

Differing approaches were used to identify ecological and human use data to incorporate in the BCMCA atlas. Ecological features and datasets were recommended by experts via workshops. Individual workshops were held for seabirds, marine plants, marine mammals, marine and anadromous fish, and marine invertebrates. Approaches used, and other details of the workshops, are described in workshop reports at www.bcmca.ca/document-library/. A list of features and data sets to represent the physical marine environment was first proposed by the BCMCA project team based on a review of similar projects, then revised following expert review. Once all available datasets for a given feature were obtained, data were collated using GIS and prepared following advice given at the workshops or given by data providers. Maps were drafted to display features on atlas pages.

Human use datasets were first sourced by BCMCA project team members within each of their organizations (e.g., federally held fisheries data, provincially held recreation data). Example maps were drafted and user group review of these data was sought through a two-pronged strategy of group-by-group engagement and through convening a human use data working group (HUWG). Six sectors or categories of human use were identified, and a nomination process was held to identify representatives from each sector to participate in the HUWG and to advise on the collation, mapping and analysis of human use data.

Due to data limitations, it was not possible to create spatial data for some recommended features, while other datasets not specifically mentioned at workshops were developed from available data (e.g., general kelp). The explicit focus of the BCMCA project was to collate existing data, but opportunities arose to create or update some ecological and human use datasets. For each feature, specific information about the source(s) and any data manipulation prior to mapping is documented on the facing page.

Once data for all features were compiled, the data were mapped and reviewed by experts. During the review process, feedback was requested about accuracy, completeness and the rigor of the methods used to represent the data. Based on feedback, several features were revised (e.g., nearshore birds, oil and gas prospects, cruise ship routes). Feature count maps (available online at www.bcmca.ca/data) that illustrate the number of data sets collated were created for each ecological group and human use sector, counting only datasets designated for use in Marxan.

known data gaps, guidelines for use & general caveats for atlas maps

known data gaps

- During the process of data collation and review, additional data for some features shown in these atlas pages was identified. BCMCA could not always obtain and incorporate these data and, in these cases, additional data sources are acknowledged in the facing page of each relevant atlas page.
- At the ecological workshops, features were sometimes recommended even though experts were aware that data were lacking to enable mapping them. These known data gaps are recorded in the workshop reports specific to each ecological feature group, available online at www.bcmca.ca/document-library/.
- For each ecological feature group and each human use sector a feature count map, available online at www.bcmca.ca/data, illustrates the spatial distribution of all the data for that group or sector that were collated and used in the Marxan analyses. These feature count maps are instructive for identifying regions and areas that may be considered data poor, where fewer data are available.

guidelines for use

One of the goals of the British Columbia Marine Conservation Analysis was to provide open access to BCMCA products with appropriate and complete documentation. These guidelines were developed to help interested parties make the most of the BCMCA products and reduce inappropriate use.

- Please acknowledge the BCMCA for products that you use in your own work. Cite as: British Columbia Marine Conservation Analysis. 2011. *Marine Atlas of Pacific Canada: a product of the British Columbia Marine Conservation Analysis (BCMCA)*, Map Title. Available online at www.bcmca.ca
- BCMCA products should be used with the understanding that they were assembled for the purposes of the BCMCA project, which was to collaboratively identify marine areas of high conservation value and areas important to human use in Canada's Pacific Ocean.
- Atlas pages are to be used in conjunction with their facing pages. When copying or printing additional pages, please keep the facing page with the map page.
- BCMCA products are shared in accordance with restrictions outlined by data providers in data sharing agreements. These restrictions are documented in each feature's metadata, available online at www.bcmca.ca/data. Where prescribed by the data supplier or authority, data includes a date beyond which its use is not recommended unless it is verified again by the user community or a refresh or update is compiled.
- Custodianship for BCMCA digital products remains with the BCMCA Project Team. Inquiries may be sent to: info@bcmca.ca

general caveats for atlas maps

- Maps are not to be used for navigation purposes.
- Information assembled by the BCMCA is the best data available to the project and comes from a variety of spatial scales. In general, data were collated for use at a coast-wide scale, but many features are appropriate for use at regional scales. Please see facing page text for feature-by-feature data resolution. We do not recommend using these maps or datasets for local-scale planning or analyses.
- Information assembled by the BCMCA also comes from a variety of temporal periods, and the mapped features may or may not represent the current state. In addition, the presence/absence, abundances, or relative importance of many features vary temporally and this variability is not represented.
- In general, absence of any thematic feature in any particular area on an atlas page should not be interpreted as true absence, as it may indicate a data gap. Areas where any feature is absent may still be important to that feature or human use, but we currently lack associated data to confirm presence or value. Wherever known, the BCMCA illustrates the spatial extents of data collection effort.
- Presence, as portrayed on a BCMCA product, may not represent the exact location of a feature.
- The BCMCA acknowledges that there may be additional existing information on features at finer scales, for limited spatial extents, other time periods, or otherwise not available to the BCMCA (e.g., for privacy concerns).
- Additional caveats for use specific to each feature are listed in each atlas facing page text.

appendix 1 – base map sources & appendix 2 – project contributors

appendix 1 – base map sources

Layer	Source	Layer	Source
Annotation	Caslys Consulting Ltd	Alaska Land Mass	Environmental Systems Research Institute (ESRI)
Terrestrial Hydrology	Natural Resources Canada	Washington Land Mass	Washington State Government
Boundaries	Natural Resources Canada, Geobase	Bathymetry	Natural Resources Canada, United States Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), ESRI
BC Land Mass	Province of British Columbia, GeoBC	Hillshade	Caslys Consulting Ltd

appendix 2 – project contributors

Project contributors include expert workshop participants, data custodians, data and atlas page reviewers, additional reviewers of workshop reports, GIS and other contractors, and many advisors.

Name	Organization	Name	Organization
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